Prototype Project Assessment and Evaluation Plan
Planning, Research, Monitoring and Assessment

Identification of Effective Restoration and Land Management Measures in the Mill Creek Watershed

I. Project Summary

A. Funding Program

The Project is supported by Proposition 40 as part of the Agricultural Water Quality Grant Program and local and federal matching funds.

B. Project Description

Sediment is one of the pollutants that is impairing aquatic life uses in Mill Creek and all of its tributaries and has been on the 303(d) list since the mid-1980s. Sources of excessive sediment have been attributed to agricultural, urban, and ex-urban land development and management practices. This project will identify and prioritize various categories of alterations to the land and watershed hydrology that contribute most to excessive erosion and sedimentation. It will also identify additional factors contributing to beneficial use impairment, so that the appropriate mix of restoration measures and land use/development practices can be put in place where they achieve the greatest anticipated environmental benefits.

C. Problem Statement:

i. Identify or characterize baseline data

Several studies have recently been completed and published that document impairment to aquatic life uses in the Mill Creek Watershed. Excessive sediment is listed as one of the main causes of anadromous fisheries declines and extirpation of Coho salmon throughout the watershed. Sediment is also suspected as a factor that contributed to placing the California freshwater shrimp on the Endangered Species list. Oakwood County is currently preparing a Programmatic Environmental Impact Report and has completed a baseline data report, inventorying biological and cultural resources, geology, hydrology, and current land use. A digitized map of vegetation cover at a 1-m resolution exists for the whole county, including the Mill Creek Watershed. Extensive historical information has been assembled documenting pre-European land cover, land use changes in the past 150 years, and modification to the stream hydrology throughout the watershed.

ii. Identify pollution source categories

Agricultural land management practices, and to a lesser extent urban and ex-urban land uses are suspected to be the main sources of excessive sediment.

iii. Identify and describe current restoration activities; Best Management Practices (BMPs); load reduction activities; prevention activities

Oakwood County has had a hillslope protection ordinance in place for several decades that applies to slopes greater than 5%. The ordinance requires review, approval, and implementation of erosion control plans prior to conversions of natural land cover to agricultural uses. Until recently, erosion control measures included large-scale expansion of the drainage network through construction of hillslope drains removing water from fields in accelerated fashion, reducing soil infiltration and causing major alterations in the hydrologic regime of tributaries and the mainstem of Mill Creek..

iv. Describe the manner in which BMPs or Management Measures are proposed to be implemented

N/A

v. Summarize how the effectiveness of proposed practices or measures in preventing or reducing pollution will be determined

N/A

vi. Determine "changes in flow pattern" in affected water bodies

N/A. While this project will not be able to measure changes in flow pattern until Management Measures are implemented, it is designed to recommend opportunities for restoring flow where current water and land management practices have reduced dry-season base flow below critical threshold levels.

vii. Determine economic benefits of implementing project

N/A. Not a requirement of AWQGP.

D. Project Activities or Tasks

Task 1: Project Management and Administration

Task 2: Develop detailed monitoring and assessment plan, including refinement of existing conceptual models reflecting our current understanding of watershed processes, and stating hypotheses that can be tested via spatial analysis.

Task 3: Develop Quality Assurance Project Plan linking project objectives with data quality objectives.

Task 4: Compile relevant historical and current datalayers and digitize maps (e.g., Mill Creek drainage network, land cover, documented wetland types and other habitats, floodplain structure); analyze and document change in georeferenced format; identify restoration constraints and opportunities.

Task 5: Obtain access permission to candidate field verification sites to spot-check interpretation of aerial photography and LIDAR images.

Task 6: Compile existing range of land management practices and document sites or areas of sediment sources, transport, and storage to land and water management practices.

Task 7: Compile a menu of alternative management practices and restoration measures tailored to sediment mobilization and storage problems identified in

Task 4 and identify suitable monitoring sites where progress toward TMDL targets could best be tracked.
<u>Task 8:</u> Prepare final report and submit data to SWAMP database.

E. Category of Project Activities or Tasks*:*
All project activities and tasks fall into the Planning, Research, Monitoring and Assessment Category.

II. <u>Project Goals & Desired Outcomes</u>
The goals of this project are:
1) Assess where and what kind of land and water use practices have contributed most to impairment of aquatic live uses.
2) Provide the information necessary to implement a range of restoration measures and land/water management practices that could mimic historic watershed processes (e.g., restoration of storm hydrographs through detention and infiltration basins and rehabilitation of wetlands; establishment of riparian buffer zones and setback levees to allow formation of meanders and important floodplain structural elements) and contribute to the prioritization of site-specific TMDL implementation options.

The *desired outcomes of this project are:*
1) Identification and mapping of anthropogenic sediment "hot spots" and linkage to current land and water management practices, such as increases in the drainage density, impervious surfaces, and other hydromodifications, as well as ill-timed water diversions, and reduction of flood plain functions.
2) Development of site-specific and watershed-wide restoration and land management options capable of mimicking historic watershed functions and processes and capable of meeting TMDL implementation targets.
3) Identification of appropriate index sites for tracking TMDL implementation progress.

III. <u>Project Performance Measures Tables</u>

Table 1
Example Performance Indicators for Planning, Research, Monitoring, and Assessment
Identification of Effective Restoration and Land Management Measures in the Mill Creek Watershed

Project Goals	Baseline Measurements and Information	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
1. Assess where and what kind of land and water use practices have contributed most to impairment of aquatic live uses.	1. Historical documentation of landcover and drainage network 2. LIDAR imagery; vegetation maps; 3. Current land cover and uses 4. Historical and current flow data	1. Digitized maps of historical and present channel network and hydrology 2. Digitized maps of historical and current habitat types	1. Site-, reach-, or area-specific options for alternative land/water management practices and restoration measures. 2. Conceptual restoration plans 3. Refinements to conceptual model of watershed processes and functions	Documenting Local Landscape Change: the Bay Area Historical Ecology Project. In: Egan, D. and E. Howell, editors, The Historical Ecology Handbook: a Restorationist's Guide to Reference Ecosystems (Island Press, Washington D.C.)	1. Broad acceptance of identified hot spots based on peer review. 2. Broad acceptance of conceptual model sediment reduction management options with identified hot spots based on peer review
2. Identify range of restoration measures and management practices that could mimic historic watershed processes and contribute to the prioritization of site-specific TMDL implementation options	1. Erosion control plans and list of BMPs currently in place or considered for implementation 2. TMDL implementation targets	1. Digitized map and classification of BMPs and restoration measures. 2. Digitized maps of known and potential salmonid spawning sites	1. Site-, reach-, or area-specific options for alternative land/water management practices and restoration measures. 2. Conceptual restoration plans 3. Refinements to conceptual model of watershed processes and functions. 3. TMDL monitoring plan elements related to tracking progress toward targets.	1. http://www.ctic.purdue.edu/Core4/CT/Choices/Choices.html 2. http://www.dfg.ca.gov/nafwb/manual.html 3. http://www.waterboards.ca.gov/sanfranciscobay/Agenda/04-16-03/Stream%20Protection%20Circular.pdf	1. Adopted list of restoration and land /water mgt. options 2. Adopted list of index sites for TMDL monitoring by WICC TAC